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Wastewater Treatment Systems for Rural Homes and Cabins

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Wastewater Treatment Systems for Rural Homes and Cabins

by Russell Derickson, Extension water and natural resources specialist, SDSU Ag Engineering Department

If you are selecting a rural site for a new house or cabin, make wastewater treatment one of your top considerations. Many people have been financially surprised to learn, after buying that perfect lot on land away from a public sewer works, that their lot is not suitable for an on-site wastewater treatment system. The lot may be too small or the system will cost substantially more than the customary rate because of special construction requirements.

There are three major items to consider on an open, rural lot:

- The building.
- The water supply.
- Wastewater treatment.

Before buying a lot, consider what future improvements like a garage, driveways, patio/deck, out-buildings, and/or swimming pool you might want in addition to the house. Then ask an on-site wastewater treatment system designer/consultant to physically look at the land to determine if an on-site system is feasible and what the system will likely cost. The best place for the on-site system may be the exact spot where you wanted the house or garage.

Look for physical characteristics of the lot that would alter the size, location, or cost of installing a septic system. Consider topography, vegetation, drainage ways, depressions, and previous construction activities on the site to identify any problems. A check of soils, depth to soil mottling, and geology of the site will determine the size and best location of the treatment field. Lots with shallow groundwater, limiting soil layers, or bedrock close to the surface may prevent an on-site system from being installed or may require specific equipment or unique installations that are cost prohibitive.

South Dakota codes mandate certain wastewater treatment requirements to maintain the environment. Be aware that some counties in South Dakota require permits and have more restrictive rules than the state. The size of the lot determines if on-site systems can be installed. State codes require the lot to be at least 1 acre (43,560 ft^2) in size or 20,000 ft^2 if drinking water comes from an off lot supply. On-site systems also must meet setback/separation distances including 10 ft to property lines, 150 ft to wells, 100 ft from the high water marks of river and lakes, 20 ft from buildings, and soil treatment fields 4 ft above limiting soil layers.

Lake cabin wastewater treatment is a special concern because groundwater is shallow and flow is almost always toward the lake. Soils around lakes generally are sandy, and ground-water flow is relatively fast. For this reason, many highly developed

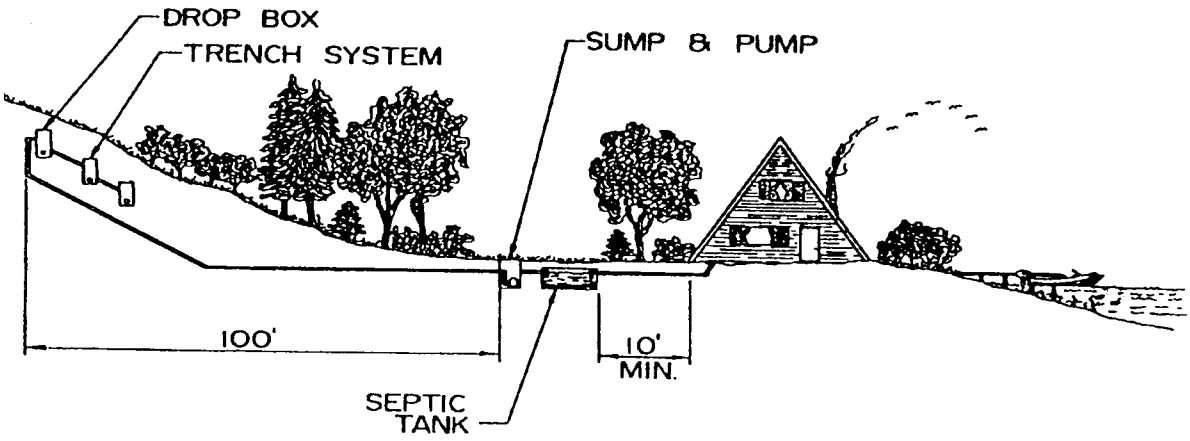
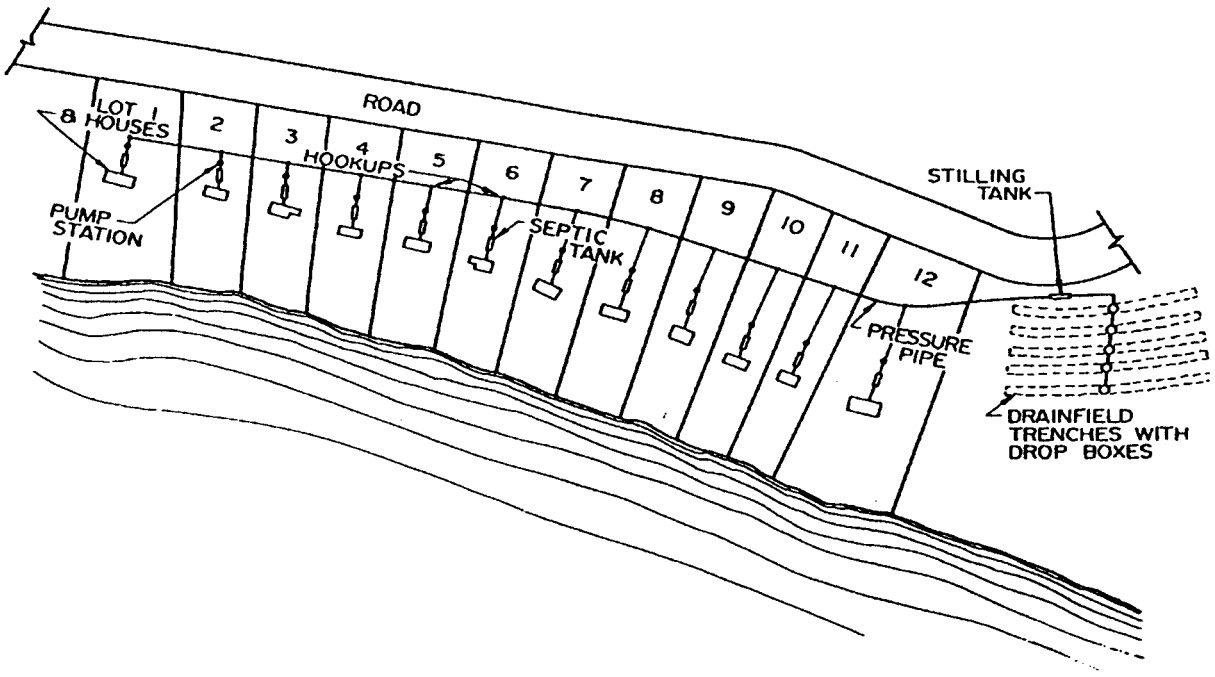


Figure 1.

A good choice for a new sewage treatment system on shoreland is a lift station to pump effluent uphill away from the lake to a safe disposal area.

Figure 2.

A 'collector' sewage treatment system for lakeshore residences allows neighbors to share reduced installation costs.



lakeshore communities have installed sanitary districts to deal with inadequately located, sized, and/or failing on-site systems built in the past. If a new cabin is high enough and far enough away from the lake's established high water mark, a gravity system probably can be installed. However, a better choice for a new installation is a lift station to pump effluent uphill away from the lake to a safe disposal area (Figure 1).

After the installer has determined where to locate the on-site system components, flag off or fence off the area for the treatment field and prevent heavy traffic (like delivery trucks and construction equipment) from compacting the soil.

Be sure the contractor waits for dry soil conditions before installing the on-site wastewater system, especially the soil treatment field portion. Failure of new on-site systems in the first year is caused by poor construction.

If you are remodeling a seasonal cabin for year-around use, consider installing a new on-site system designed for higher wastewater flows. Alternatives include increasing soil treatment field size, adding a lift station to an adequately sized treatment field away from water bodies , or installing a "collector" system with a group of neighbors and sharing the reduced installation costs (Figure 2).

To evaluate your on-site system's performance, obtain a copy of Farm•A•Syst Worksheet 6 or a Home•A•Syst packet from your local county Extension office. These materials include a fact-sheet about proper on-site system management. Completing the worksheet will give you a good estimation of how well your on-site system is being maintained.

To learn more about on-site systems, contact your local county Extension agent, a certified on-site wastewater treatment contractor, or a septic tank pumper. You also can purchase a copy of MWPS-24 "On-site Domestic Sewage Disposal Handbook" ($6.00), available from the SDSU Agricultural Engineering Dept. Box 2120, Brookings, SD 57007, 605-688-5667.

Ask at your County Extension Office for these free publications about on-site wastewater treatment:

- EC 665 Rural Wastewater Treatment for Individual Homes
- ExEx 1018 Septic Tank Maintenance
- ExEx 1033 Periodic Maintenance for On-site Wastewater Treatment Systems
- ExEx 1034 Solving On-site Wastewater System Backups
- ExEx 1035 Septic System Additives

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